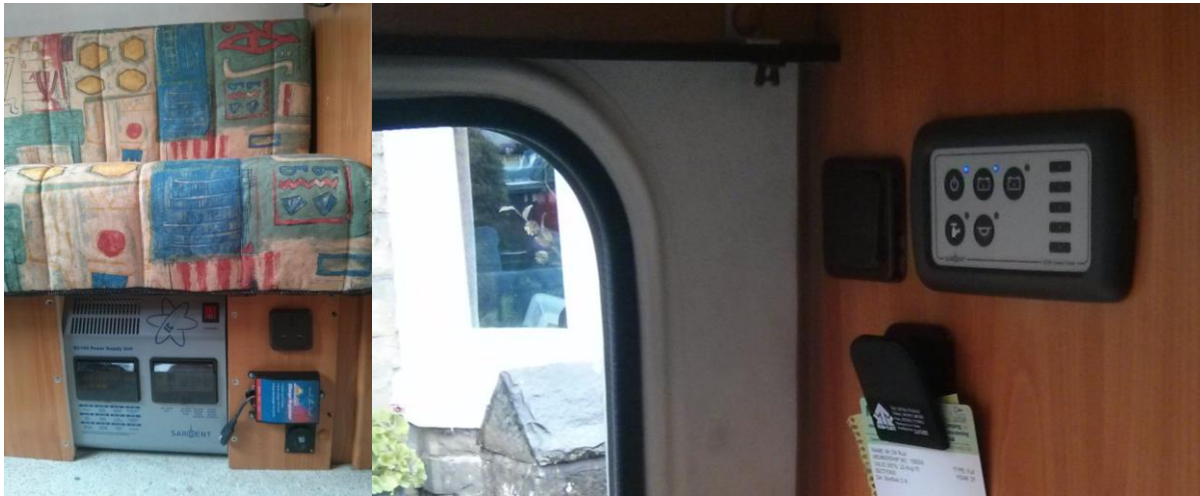


Upgrading the electrical system on a 1998 Eriba Caravan



Summary

In 2011 we bought our Eriba Familia 310 caravan from a used Eriba dealer in the Netherlands. Like many continental Eribas it was not fitted with a battery so the dealer fitted a battery and charger as part of the sale. This was not a good conversion and we had further work done by three different caravan specialists, plus some rectification by myself, which gave us a workable system but little confidence that we had reliable or safe electrics. I also felt that the BIP control box fitted to the Eriba was an archaic and complicated setup which was difficult to understand and not properly documented.

So this year (2015) I decided to replace the original electrical system and the added charger with a modern caravan control box (Sargent EC155), attached to the existing wiring of the van. The first attempt resulted in a working system but a tangle of patch leads and junction boxes where it was joined to the existing system so I then added a complete caravan wiring harness from Sargent which was quite easy to fit, replacing a great deal of the existing Eriba wiring and resulting in a sound system.

I strongly recommend the wiring harness which is much easier and quicker to fit than patching the existing wires onto Sargent's connector kit. Finally I've replaced the existing towing cable with a new 13-core cable as the existing one lacked a specific earth connection (pin 11) that is needed for the Sargent system, I think this is because the original installation used a 10-core cable that was retained when the van was changed to a 13-pin towing connector.

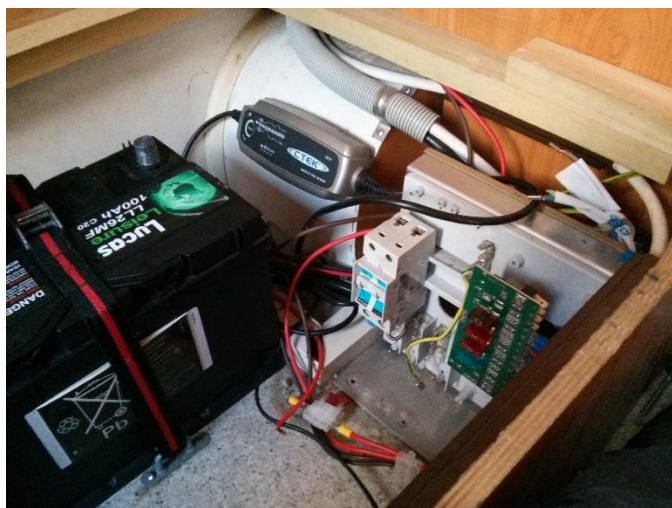
I would recommend this DIY upgrade to anybody who has experience of electrical installation ***and is able to judge the safety of an installation like this***, but it would be unwise to take it on as a novice. My own background includes an engineering apprenticeship, rewiring a whole house as well as installing additional plug sockets etc in other houses, and some work on the electronics of public address and music equipment. I feel this gave me the knowledge and skills to do this work and deal with the inevitable problems and mistakes that can occur the first time you take on a new technical task.

The cost to me was around £400 but I made some expensive mistakes and had to buy quite a few specialist tools, as well as doing additional work on the towing cable and replacing the underfloor junction box. A budget of £300 might be reasonable if you take advantage of my experience and are already well-equipped to do the work.

Technical History, and why this became a DIY project

When we bought the caravan it had a single 7-pin towing connection with some deeply non-standard wiring to route the battery power into the van via a second 7-pin connection that the Dutch dealer (Expert 1) fitted to the front of the van, so the towing cable was always connected to either the car or the van battery.

This was a complete pain and quite possibly unsafe. It also had some way of running the fridge on the car 12V but it always blew a fuse on the car if we had both fridge and running lights on together.



The BIP unit in situ (with front cover removed), the CTEK battery charger is on the left of the BIP unit.

Soon after that we took the van to a well-known seller and fixer of Eribas in the UK (Expert 2) and asked them to install a proper 13pin system and generally make sense of the electrics. They removed the original 230V/12V transformer circuit from the BIP unit (probably a good idea) and generally tidied up the system. They did not fit a new 13-core cable as the existing cable had 10 cores which, in their opinion, were sufficient, so they just added a 13-pin towing connector.

Although this created some order, it was not a big success. In particular the fridge did not operate on 12V and we had some scary flashing lights (all the lights in the van) when the fridge was turned on. I had to do a lot of detective work on the BIP box circuits to track down the problem. Expert 2 had crossed over the fridge supply and the flashing was the relay that usually detects the alternator power going into a spasm through receiving DC the wrong way round. You can imagine how I felt.

Having restored some order I took the van to a local caravan repair/maintenance business (Expert 3) who seemed sensible and I asked him about charging the caravan battery from the vehicle on the road (the previous guy had said he would do that but just forgot, despite having the van for months). Expert 3 fitted a very basic fused cable direct from the towing electrics to the battery and (as far as I can remember) this just caused further problems with the fridge without apparently charging the battery. So I took that off.

Finally we took it to a large caravan dealer with a highly regarded electrician (Expert 4). He didn't do any harm and said that the electrics were safe but, despite much prompting, he didn't have any ideas about making it more practical.

So recently I decided that the only way forward was DIY and having looked at some of the information about Eriba electrics and their general inscrutability I started to look at replacing the whole control system with something more modern.

My main aims were twofold: First to ensure that the system was completely understandable and easy to work on if anything went wrong, and secondly to see if the battery might be charged while being towed. More generally I just wanted to have more confidence in the setup. Having invested in a big refurbishment of the exterior bodywork this seemed to be the other thing needed to extend the life of the van.

Overview of the new system

I chose a **Sargent EC155 control unit** which is sold as a complete system for new caravans and motorhomes, Sargent provide a complete kit including remote control unit and wiring harness.

The EC155 is too large to fit in the same location as the original BIP box, and I wanted to have a setup that was easy to access, especially as the unit is intended to be accessible in everyday use, with an on/off switch for the battery charger. Also we tend to keep the double bed made up when living in the van which makes an underbed/underseat unit particularly difficult to access.

So I created a bay for the unit in the front panel that supports the bed/seat making the front of the control box accessible at all times.

The Sargent remote control panel I've fitted on the side of the wardrobe, by the entrance to the van. This allows you to turn the 12v system on and monitor the battery condition.



The wiring harness from the EC155 provides everything needed for a caravan or motorhome, generally I took each new wire to the furthest reachable point on the existing wiring, for example the junction box behind the refrigerator where the front 240V sockets and 240V fridge wiring are found, or the lighting circuits where they disappear into the van walls.

The result is still a bit of a tangle of cables from the EC155, partly because of its location, but I will be looking at how to box that in once we have had a thorough shakedown. At the moment that underseat box is not used for storage so there's no danger of anything being damaged by moving objects.

As well as the EC155 system and the existing Eriba lights, fridge, water pump and mains sockets I've included a couple of 'cigar lighter' 12V sockets at each end of the van and a small solar controller for the panels we use to top up the battery on all those lovely small sites with no hookup.

Finally I should say that Sargent are an excellent Yorkshire company, I've had first rate telephone technical support and good service from the sales department. Another member of the Eriba Folk Facebook discussion group also commented on the company's good reputation. Their main business is supplying electrical kit to caravan manufacturers and my only criticism is that they could provide clearer information about the products on their website, although they give an excellent installation guide with all the diagrams and data you need.

What I Used - Materials and Tools

- **Sargent EC155 Control Unit, with Wiring Harness**
(the harness is an optional add-on to select when you buy the EC155 online, it's not listed separately in the web catalogue but you can buy it by phone from Sargent if you need one later as I did)
- **Sargent EC50 Remote Control Panel.**
It's not explained anywhere on the company's sales information but the system will not work without this control panel. I was lucky that I decided to buy one anyway. I bought the longer 5m cable for this, which just reached round the van from the controller to the wardrobe. It's a standard Ethernet cable so if you need a longer one you can probably find what you need on Amazon or your local branch of Maplin or PC World.
Sargent sell the EC155, Harness and EC50 as a kit which is probably the best value but it only includes the 2m data cable for the control panel, and you'll almost certainly need a longer one.
http://sargentshop.co.uk/epages/eshop328964.sf/en_GB/?ObjectPath=/Shops/eshop328964/Products/WB6001
- **13-pin towing cable**
luckily Sargent sell a standard one, around 3.5m long, ready made-up for one of their caravan manufacturing customers, and that was long enough. It's nice to have that complex multi-pin plug assembled in a factory. The made-up cable is not on the Sargent online shop but when I phoned them their sales guy suggested it as a better alternative to buying plug and cable together.
- **Weatherproof (IP55) junction box**
to replace the box under the van where the towing cable meets the wiring from the van. The existing one had a broken fastener which meant it was no longer weatherproof, plus another fastener that was chewed up. Another reason to be exasperated with the various 'experts' who have worked on the van at our expense. Yours may be fine and obviously it's not necessary to replace if it is not broken. This one is bigger than the original and I haven't fitted it yet, done a temporary repair with Gaffer Tape for our forthcoming trip, but it should do the job.
<https://uk.rs-online.com/web/p/junction-boxes/0151808>
- **Multimeter**
best to have one with crocodile clips on the test leads so you can have your hands free. You can buy a multimeter for anything between £10 and £1000 but a cheap one should be fine for this kind of job to check voltages and continuity. Maplin have a good selection.
- **Something for testing mains sockets**
I have a polarity testing plug that cost £5 and works fine. (We bought it for checking polarity on old-type French hook-ups)
<http://www.amazon.co.uk/Winner-Mains-Polarity-Tester-Plug/dp/B002QW3SL8>
- **A good quality crimping tool**



not a cheap hobby tool. I bought a ratchet crimping tool from Screwfix, only £15 (they don't seem to do it now) and it works very well. I wouldn't use a non-ratchet one having experienced the difference in reliability.

- **A good selection of crimped Terminal Connectors**



Halfords do a kit which makes a good starter but I had to top up the blue inline joints, male & female spade connectors plus largest size yellow ring connectors for the Earth commoning block. Halfords have all the different sizes and styles of connector on display in their shops <http://www.halfords.com/motoring-travel/tools-diy/fuses-electricals-fixings/halfords-terminals-connectors>.

- **An earth commoning block**



to bring all the 12V earth wires together. The 3-bolt one I used is probably overkill, there's a 2-bolt version. You'll also need some 8mm washers as spacers between the connectors <http://www.altecautomotive.co.uk/300-amp-automotive-wiring-power-jointingconnection-box-altpj2-1604-p.asp>

- **Some large capacity terminal strips** for mains connections, I think mine were 20A
- **A junction box for the hookup cable**
The one on the harness doesn't reach all the way to the hookup socket on the Familia 310, aaargh! I bought a small junction box at Homebase
- **Lots of tools**
Wire stripper, sharp knife, scissors, good edge cutters, all the screwdrivers you can think of, small (1/4 inch) socket set, insulating tape (including a roll of white insul tape for labels), assorted heatshrink tubes and a hot air gun, some flexible conduit or cable tidy, a good supply of woodscrews and self-tapping screws, especially small and tiny ones, cordless drill and a set of bits including some flat bits for bigger holes in wood.
- **A mains test lead to provide power to each circuit.**
for the initial investigations – I made one up with a 13A mains plug at one end and a three-way terminal block at the other end.
- **A 12V test lead ditto**
a pair of those fast-fitting battery clamps wired to a 2-way terminal block
- **Permanent marker** with a relatively fine point
- **A strip of old carpet** to lie on under the van
- **A low stool**, you'll spend a lot of time working at or close to floor level.
- And probably quite a lot of other stuff I can't remember but you'll work out in time.

Preparations and Initial Investigations

Before starting work on the new system I had to learn the old one and remove the old kit. The first step, and the scariest, was to disconnect the old BIP unit. Scary because once that was done there was no way I could put it back

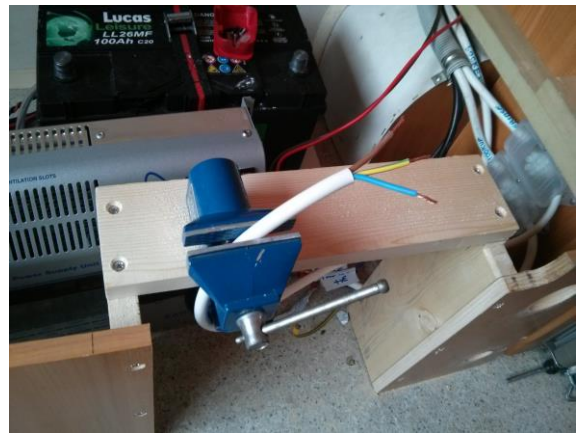
Once that was done I had to painstakingly go through every wire to work out what it did and label it (with a tab made from white insulating tape) or write on the white mains cable.



BIP unit removed and cables labelled

You'll need to think carefully about keeping all those bare ends of wires under control, safe and not touching each other. And of course you will not have the mains hookup connected to the van unless you are making a controlled test that requires it.

You can probably locate the hookup cable by short circuiting each of the mains cables in turn to find out which ones short out the hookup connector, I think I went on to check that result by plugging in the hookup and checking the voltages across the cable ends, first securing the potentially live cables with tape so they were accessible and well away from any other wires.



Hookup cable held securely so power can be supplied via hookup and measured at the bare ends. Don't do this unless you feel very confident and be vigilant with live wires. That little clamp-on vice was very useful

Then I attached the mains test lead (with an extension to my house) to each of the 'unknown' cables in turn to see what operates – mains sockets or fridge. I was using the 'tails' that had been connected to the original controller but if I was doing it again I would just go to the mains junction box behind the fridge.

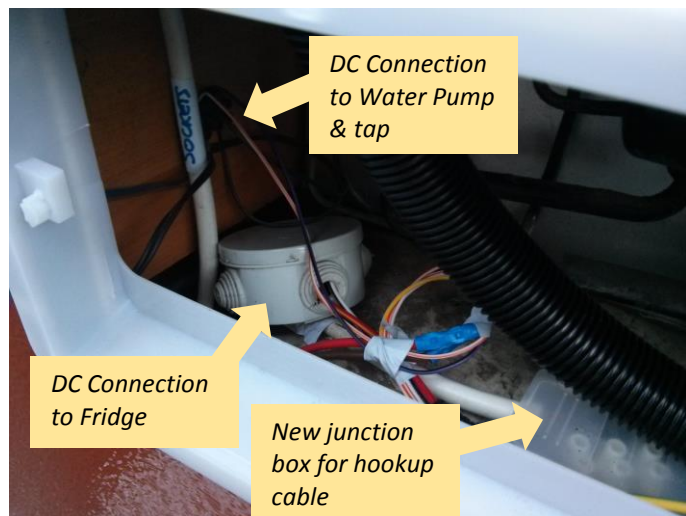
To gain access to the wiring behind the fridge I just removed the two Electrolux vents on the outside of the van, it's all there and nicely accessible.



Originally the van had a single 240V supply going to this junction box and then onwards to the three mains sockets and fridge but the EC155 has separate circuits for mains sockets and fridge so I separated the two circuits ready for the new wiring harness to be attached.

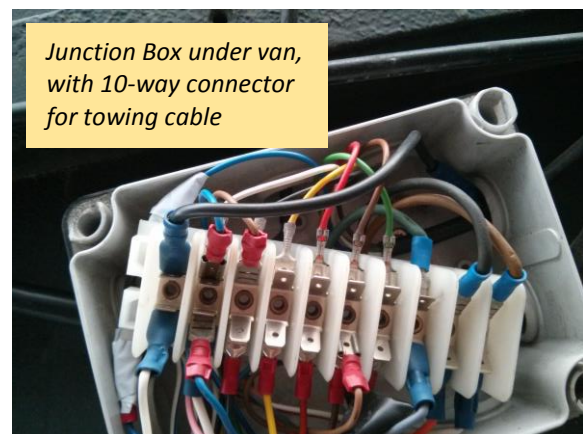
One of the mains sockets is at the rear of the van near the EC155 so I removed its cable from the mains junction box completely as it can be wired direct to the EC155. I also cut the hookup cable where it passes through the space behind the fridge and removed the section that went to the BIP box, and the cable that originally took power from the BIP unit to the mains junction box.

While working behind the fridge you can identify where the water pump and fridge 12V cables connect, and I had a 12V cable pair for a socket that I had fitted previously at the front of the van.



The wiring to lights disappears into the wall so I used my 12V test lead to power up each one in turn and check which operated which lights. On our van they were divided into front, mid and rear+porch light. The EC 155 has front and rear lighting circuits which was a bit of a pain because I had previously fitted a pair of halogen spots as bedhead reading lights and connected them to the mid lights over the cooker. So whether the mid light was included in front or rear, it meant most of the lighting on one fuse. I may rewire the new spots together with the rear light so each circuit has four lights on it (we hardly ever use the porch light).

Finally I needed to identify the cables coming into the van from the towing connection. I think I did this initially by attaching the car and checking the cables with my meter. But in the end I needed to work in the junction box under the van and the connections are very visible there as long as the colour coding on your towing cable is correct.



So having used the 12V and mains test leads to power up and verify everything and label it I was ready to fit the EC155. The circuits on our van now are:

240V AC

- Rear socket
- Front and mid sockets (wired through the junction box behind the fridge)
- Fridge (also wired through the junction box behind the fridge)

12V DC

- Front Lights (Front, mid and reading lights)
- Rear Lights (Rear and porch lights)
- Fridge 12V when car engine running
- Water pump
- Cigar Lighter Socket Rear
- Cigar Lighter Socket Front.

Towing

- Earth
- Power from car battery
- (Fridge) Power when alternator running
- Earth for Fridge (not present on existing setup, see below)

Earth

- Green/Yellow earth cable from common earth bonded to van chassis
- Earth cable from Sargent body, via common earth, bonded to gas pipe (not fitted originally and I'm still pondering how to route it)

Installing the EC155 Control Unit

The old BIP control box was hidden away in the under seat storage space. This caused two problems: the charger on/off switch, fuses and circuit breakers were not accessible without going inside that space, very awkward when the bed it made up, as it is most of the time; and the EC155 was too wide to fit in the same location.

So I decided to do some carpentry and create a 'bay' in the seat support panel, allowing the EC155 to be installed in a recess. Location was crucial as it has to be fitted to the rear of the section of that panel that supports the bed support tube.

The final arrangement was very satisfying as it was probably stronger than the original seat support (and I took the opportunity to replace/relocate quite a few screwed fixings that had become quite feeble) and the EC155 was nicely supported/protected with air space above and below



Wiring harness



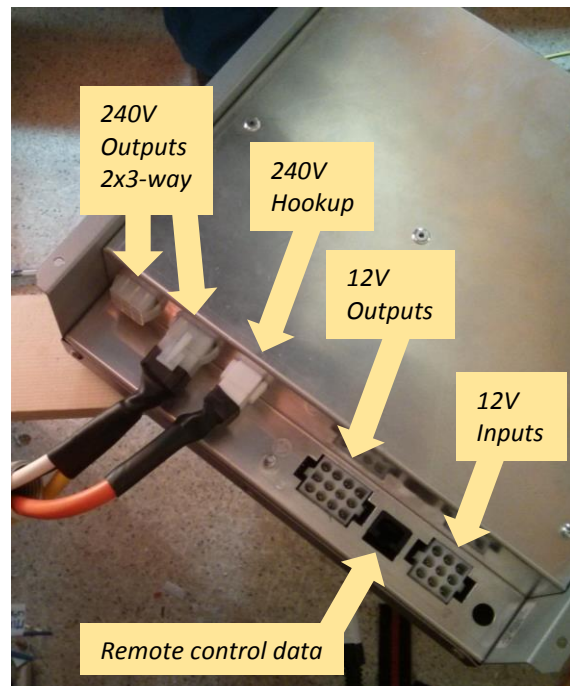
Fitting the new wiring was straightforward, just requiring care in ensuring the right cables were connected and cut to a suitable length for tidiness while still allowing the whole thing to be dismantled. You have to remove the EC155 from its bay and lift it up a bit to get at the sockets on the back. The harness was fitted with 5 plugs as follows:

240V

- 4-pin hookup
- Multiway plug with two cables for sockets and one for the fridge
- There is a socket on the EC155 for a second multiway plug which duplicates the first one, if you need a lot of mains for your central heating blower, jacuzzi or whatever.

12V

- Multiway plug for main power cables (batteries, fridge). The car and leisure batteries and associated earths have two cables each to ensure capacity.
- Multiway plug for lights, pump, 12V sockets and a lot of things that are not to be found in our Eriba. It was interesting to find out the kind of electrical self-indulgence available in modern white boxes.



I used a mixture of inline and spade connectors to connect the harness to the existing wiring in the van, with hindsight I recommend using spade connectors for everything because you never know when you need to disconnect something to test it, tidy up the wiring or correct a mistake (as I discovered). The large number of redundant 12V wires in the harness were cut off and insulated leaving a few inches of each wire available in case I find a use for them in future.

The harness provides a good number of earth wires, two went to the common earth block where several other earths, eg the lighting, ended up. Other earth wires were taken to the 12V sockets, pump and fridge and there were a couple unused so I coiled them up against a rainy day.

The earths from the vehicle chassis, leisure battery, car battery and the metal body of the EC155 were also taken to the common earth block, the EC155 earth is extended without a join with a long section to be bonded to the gas pipe which does not seem to be accessible inside the van, it's not long enough to reach into the gas locker so I will have to route it through the floor somewhere near the front of the van.



One exceptional earth is the separate earth wire for the Fridge 12V. It took me a while to realise that this is needed so that capacity of the earth wires matches that of the power wires from the car to charge the leisure battery and run the fridge. This was the main reason for replacing the towing cable, the existing one only had a single earth wire and was not connected to pin 11 which carries this additional earth.

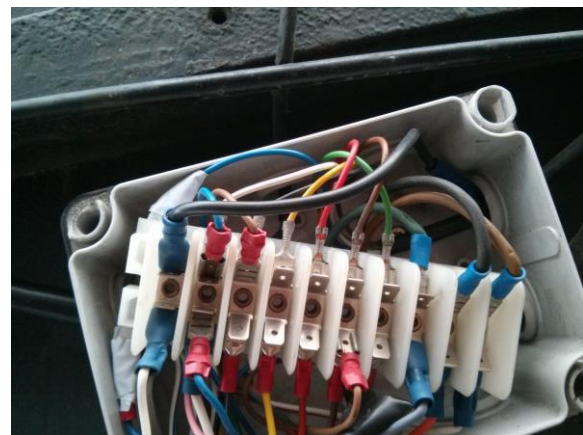
New 13 Pin Towing cable

To fit the new 13 core cable I started at the car end, ensuring there was a similar amount of free 'tail' as the existing cable, then removing the large cable ties that fastened the old cable to the towbar, and fastening the new on in place. Once under the van there was a series of steel clips holding the cable to the chassis and these could be easily prised open so the two cables could be swapped.

Under the van there is a large junction box that's easy to open up and work on as long as you are comfortable lying on your back (I laid down some carpet off-cuts) and you raise the front of the van as high as possible.

I was relieved to find that all the wiring on the van followed the standard colour coding for towing cables.

Inside the box there is a 10-way connector block with 4 spade connectors at each position, so up to 4 wires can be joined together. The cable going to the rear lights and indicators of the van uses the same colour coding as the towing cable. So I just needed to note which wires were connected to the three cables carrying Earth, battery and fridge power into the van and find a way of carrying the additional fridge earth inside.



I was able to feed a length of suitable earth wire through the hole in the floor carrying the other cables. All ten connections on the connector block were already in use so I disconnected the relatively lightweight blue wire for the rear fog lights and joined them together separately with a short wire link (wrapped up well in insulating tape), tucked it away and used the vacated spades to link up the black and white earth cable of pin 11. That left two unused wires on the 13-core towing

cable: pin 12 which has no function and the pink wire for pin 8, for the reversing light which is not fitted.

Testing

At each stage I tested what I had done, first the 230V AC, then the internal 12v DC, then the towing cable (with the car attached). There were one or two problems, mostly my errors but also one problem with the EC155 when the water pumped failed after a day's use on a weekend trip. Having checked everything it appeared that there was no longer any power coming from the EC155, possibly a broken connection. I was able to cut the wire and connect it to the short retained length of the toilet pump wire, which does give power and comes from the same fuse as the water pump.

I'll let Sargent know about that and once we've had a longer shakedown trip to show up any other faults I might send the unit back for them to fix this problem.

But apart from that one problem, everything works. When the car is running the unit delivers around 14V charging supply to the leisure battery, the control panel gives a visual indication of battery voltage and allows us to turn everything off when the van is not in use.

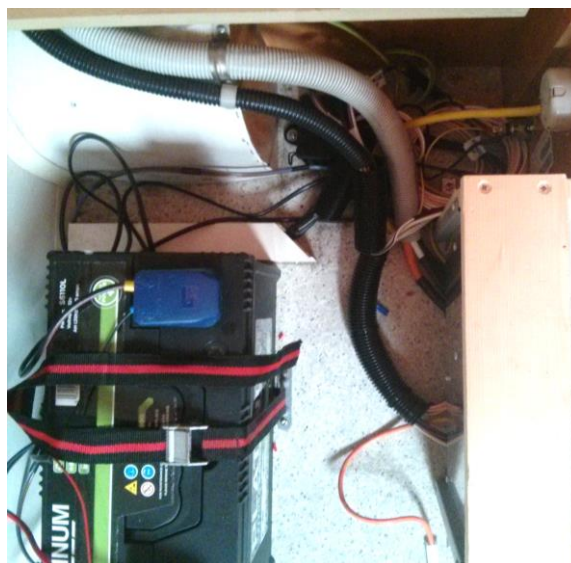
I've had it running on hookup with all the 12V stuff switched on for a few hours and there's no evidence of overheating, the EC155 just gets a little warm.

I did have problems with the rear vehicle lights on the van, several did not work but on investigation I found that the bulbs were not making good connections, 17 years of gently corroding had taken their toll and a bit of taking them out and putting them back restored order. So I've bought a new set of bulbs.

Making it tidy

I've made extensive use of flexible conduit to protect and control the wiring, particularly a split cable-tidy conduit that can be wrapped round a bunch of cables and secured with cable ties.

There is still a bit of cable left to tidy up but then I will probably work out a way of boxing everything up in a plywood enclosure so that underseat space can be used for storage.



Time

A number of things happened that incurred a lot of extra time and cost. I had a difficult false start when I tried to do the job without the wiring harness, after all the caravan was all wired up already, why did I need a whole load of new wires? So I bought Sargent's EC155 connector kit and soldered the little bullet inserts for the multiway plugs onto all the wires in the van.

That was a really long and tedious job, it included making up a great number of patch leads to extend the existing wiring via junction boxes and other multiway plugs and left the whole thing looking like a mess of spaghetti no matter how hard I tried to make it tidy. And the scope for errors was huge so of course I made quite a few.

Eventually I had it all working apart from the 12V for the fridge (later I found it had blown a fuse probably because of a fault in my wiring) and we went off for a weekend tryout. It worked well enough apart from the water pump losing power but I came to the conclusion that it was just too messy and there were too many things that might be badly connected.

So I started all over again with the wiring harness and it went beautifully, probably two day's work although I did it over three days. Say three intensive days including the towing cable and initial detective work and any fault-finding. Allow a week for the complete job and you should be OK (I prefer to take my time and have a rest and thinking time between each stage)

Do it Again?

I would. Once I had worked out how to do it the job was pretty easy.

Should you do it? Only you can say and you are totally responsible for deciding what is safe to do on your van.

